

IN THE SPECIFICATION

Please replace the paragraph beginning at page 2, line 12, with the following rewritten paragraph:

As improvements of these problems, there have been reported phosphors which are excitable at higher efficiency in the near-ultraviolet region, for example, La<sub>2</sub>O<sub>2</sub>S:Eu (KX-680 manufactured by Kasei Optonix Ltd.), LiEuW<sub>2</sub>O<sub>8</sub> described in ~~JP-A 2003-4152 JP-A-2003-41252~~ and the like. On the other hand, it has been known that a fluorescent complex having Eu<sup>3+</sup> emits a sharp red color at high efficiency, and the excitation wavelength can be adjusted by a suitable selection of ligand. Accordingly, there has also been reported a light emitting device in which the fluorescent complex is combined with the LED or LD as the red phosphor. For example, according to WO02/91487, there has been reported an Eu complex derived from the f-f transition of Eu<sup>3+</sup> and showing high excitation efficiency at a specified wavelength in the near-ultraviolet region. Further, according to JP-A-2003-81986, there has been reported a light emitting material containing a high-efficiency Eu<sup>3+</sup>/β-diketone complex and also excitable at 400 nm or more in the visible region.

Please replace the paragraph beginning at page 4, line 19, with the following rewritten paragraph:

[Patent Document 1]

~~JP-A-2003-4152 JP-A-2003-41252~~

Please replace the paragraph beginning at page 10, line 13, with the following rewritten paragraph:

As for reference numerals in the figure, 10 indicates a light emitting device, 11 indicates a semiconductor light emitting element, 12 indicates a phosphor layer, 13 indicates

an external cap, 14a indicates an inert gas, 14b indicates an ultraviolet absorbing layer, 15a and 15b indicate conductive wires, 16a indicates an inner lead, 16b indicates a mount lead, 17 indicates a sealing resin portion, 18 indicates a ~~blanket~~ blaket, and 19 indicates an electric contact.

Please replace the paragraph beginning at page 24, line 10, with the following rewritten paragraph:

With respect to the emission efficiency of the phosphor used in the present invention, methods for obtaining the quantum absorption efficiency  $\alpha_q$  and the inner quantum efficiency  $\eta_i$  are described below. First, a cell is filled with a phosphor sample to be measured which has been converted to a powder form or the like, with a surface sufficiently smoothed so that the measurement accuracy is maintained, and attached to a spectrophotometer having an integrating sphere. As this spectrophotometer, there is, for example, MCPD7000 manufactured by Otsuka Electronics Co., Ltd., or the like. The reason for the use of the integrating sphere and the like is due to making it possible to add up all of photons reflected at the sample and photons discharged from the sample by photoluminescence, that is to say, due to preventing photons from flying away from a measurement system without being added up. This spectrophotometer is equipped with a light emission source for exciting the phosphor. This light emission source is, for example, a Xe lamp or the like, and adjusted to an emission peak wavelength of 400 nm with a filter or the like. The sample to be measured is irradiated with light from the light emission source adjusted so as to have an emission peak wavelength of 400 nm, and an emission spectrum thereof is measured. In this measured spectrum, in addition to the photons discharged from the sample by photoluminescence by the light from the excitation light emission source (hereinafter briefly referred to as excitation light), contribution of the photons of the excitation light reflected at the sample is actually

overlapped. The absorption efficiency  $\alpha_q$  is the value of the photon number  $N_{abs}$   $\underline{N_{abs}}$  of the excitation light absorbed by the sample divided by the total photon number N of the excitation light. First, the latter total photon number N of the excitation light is found as described below. That is to say, a material having a reflectance R of approximately 100% to the excitation light, for example, a reflecting plate such as Spectralon (having a reflectance of 98% to the excitation light at 400 nm) manufactured by Labsphere, is attached as a subject to be measured to the spectrophotometer, and a reflection spectrum  $I_{ref}(\lambda)$   $\underline{I_{ref}(\lambda)}$  is measured. The numerical value determined herein from this reflection spectrum  $I_{ref}(\lambda)$   $\underline{I_{ref}(\lambda)}$  by (equation 1) is proportional to N.

Please replace the paragraph beginning at page 26, line 3, with the following rewritten paragraph:

As for the integration zone used herein, integration may be substantially performed only in a zone in which  $I_{ref}(\lambda)$   $\underline{I_{ref}(\lambda)}$  has a significant value. For example, it is sufficient to take within the range of 370 nm to 420 nm. The former  $N_{abs}$   $\underline{N_{abs}}$  is proportional to an amount found by (equation 2).

Please replace the paragraph beginning at page 27, line 2, with the following rewritten paragraph:

A method for determining the inner quantum efficiency  $\eta_i$  is described below.  $\eta_i$  is the value of the number NPL of photons generated by photoluminescence divided by the number  $N_{abs}$   $\underline{N_{abs}}$  of photons absorbed by the sample.

Please replace the paragraph beginning at page 28, line 25, with the following rewritten paragraph:

The light emitting device of the present invention further has a blue phosphor and a green phosphor, together with the above-mentioned red phosphor, and a combination of these makes it possible to emit white light. For example, the blue phosphors include an inorganic phosphor such as ZuS:Ag ZnS:Ag, Sr<sub>5</sub>(PO<sub>4</sub>)<sub>3</sub>Cl:Eu or BaMgAl<sub>10</sub>O<sub>17</sub>:Eu. Further, the green phosphors include an inorganic phosphor such as ZuS:Cu, ZnS:CuAl, BaMgAl<sub>10</sub>O<sub>17</sub>:Eu or Mn. In addition, the blue phosphors include a thulium complex, and the green phosphors include an organic phosphor such as a terbium complex. As the ligands of these complexes, there can be used known ligands, as well as the ligands of the Eu<sup>3+</sup> complexes used in the present invention.

Please replace the paragraph beginning at page 30, line 10, with the following rewritten paragraph:

An example of the light emitting device of the present invention is shown in Fig. 3. The light emitting device 10 shown in Fig. 3 comprises a blanket blaket 18, an outside cap 13 which covers an upper portion of the blanket blaket 18 and is formed in a dome form, for example, from a light-permeable material such as glass, a mount lead 16b and an inner lead 16a which are attached to the blanket blaket 18, an electric contact 19 which is attached to a lower portion of the blanket blaket 18 and conductive to the mount lead 16b and the inner lead 16a, a semiconductor light emitting element 11 housed in a cup of an upper portion of the mount lead 16b, a sealing resin portion 17 such as an epoxy resin which is filled in the cup of the upper portion of the mount lead 16b to fix the semiconductor light emitting element 11, a phosphor layer 12 of a film in which a phosphor is mixed and dispersed in a binder resin and which is coated on the inside of the outside cap 13, an ultraviolet absorbing

layer 14b formed lying between the phosphor layer 12 and the outside cap 13, a conductive wire 15a which makes the inner lead 16a and the semiconductor light emitting element 11 conductive to each other, and a conductive wire 15b which makes the semiconductor light emitting element 11 and the mount lead 16b conductive to each other. The inside of the outside cap 13 is in vacuum or filled with an inert gas 14a such as nitrogen gas or argon gas.

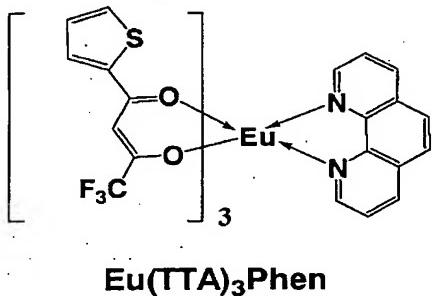
Please replace the paragraph beginning at page 41, line 8, with the following rewritten paragraph:

0.80 g (3 mmol) of H-2NFA, 0.33 g (1 mmol) of 4,7-diphenyl-1,10-phenanthroline (DPPhen) and 0.32 g (3 mmol) of 2,2'-iminodiethanol were dissolved in 20 ml of ethanol. To this solution, a solution obtained by dissolving 0.37 g (1 mmol) of europium chloride (III) hexahydrate in 20 ml of a mixed solvent of water/ethanol (1/1) was added dropwise at room temperature taking 30 minutes. A precipitate formed was filtered by suction, and washed with water. Then, the resulting slight orange powder was dried under vacuum at ~~50~~ 50°C. After this powder was instantly heated to 130°C in a non-solvent state, a mixed solvent of ethanol/isopropanol (1/1) was added, followed by reflux in a suspended state for 30 minutes. Then, the suspension was slowly cooled to room temperature. The resulting precipitate was filtered by suction, and washed with ethanol. Thereafter, it was dried under vacuum at 50°C to obtain a desired product Eu(2NFA)<sub>3</sub>DPPhen represented by the following structural formula. The melting point of this complex was from 173°C to 176°C.

Please replace the paragraph beginning at page 43, line 25, with the following rewritten paragraph:

For the resulting Eu(TTA)<sub>3</sub>Phen complex, a powder X-ray diffraction measurement was made. A powder X-ray diffraction pattern thereof is shown in Fig. 5. A comparison of

Figs. 4 and 5 reveals that the complex is a compound different from that shown in Fig. 4 in crystal structure.



Please replace the paragraph beginning at page 45, line 19, with the following rewritten paragraph:

1.87 g (9 mmol) of hexafluoroacetylacetone (HFA), 1.70 g (6 mmol) of TPPO and 0.95 g (9 mol) (9 mmol) of 2,2'-iminodiethanol were dissolved in 40 ml of isopropanol. To this solution, a solution obtained by dissolving 1.10 g (3 mmol) of europium chloride (III) hexahydrate in 20 ml of a mixed solvent of water/isopropanol (1/1) was added dropwise at room temperature taking 30 minutes. To the resulting yellow transparent solution, 20 ml of water was added little by little, and stirring was further continued at room temperature for 1 hour, followed by standing for several hours. A precipitate formed was filtered by suction, and washed with water. Then, the resulting slight orange powder was dried under vacuum at 50°C to obtain a desired product Eu(HFA)<sub>3</sub>(TPPO)<sub>2</sub> represented by the following structural formula. The melting point of this complex was 290°C or more.